

CLAIMS

1. A method of purifying exhaust gas of an internal combustion engine comprising steps of:

5 disposing a NOx occluding and reducing catalyst in an exhaust gas passage of the internal combustion engine to selectively occlude and hold NOx in the exhaust gas by adsorption, by absorption or by both of them when the air-fuel ratio of the exhaust gas flowing in is lean, and to reduce the occluded NOx with  
10 reducing components in the exhaust gas when the air-fuel ratio of the exhaust gas flowing in becomes the stoichiometric air-fuel ratio or a rich air-fuel ratio; and

15 causing said catalyst to occlude the NOx in the exhaust gas from the engine when the engine is operated at a lean air-fuel ratio, and purifying the NOx occluded by said catalyst by reduction with reducing components in the exhaust gas from said engine when the engine is operated at the stoichiometric air-fuel ratio  
20 or at the rich air-fuel ratio;

wherein a sulfur-solidifying agent that forms a solid sulfate upon the reaction with SOx at the time of combustion is supplied to the engine to solidify the SOx in the exhaust gas thereby to prevent the SOx in  
25 the exhaust gas from being occluded by the NOx occluding and reducing catalyst, and the amount of supplying said sulfur-solidifying agent to the engine is controlled depending upon the condition of the atmosphere at said catalyst.

30 2. A method of purifying exhaust gas of an internal combustion engine as set forth in claim 1, wherein said sulfur-solidifying agent is supplied to the engine in a decreased amount or is not supplied when the condition of the atmosphere at said NOx occluding and  
35 reducing catalyst is one for suppressing the occlusion of SOx by the NOx occluding and reducing catalyst.

3. A method of purifying exhaust gas of an

internal combustion engine as set forth in claim 1,  
wherein said sulfur-solidifying agent is supplied to the  
engine in a decreased amount or is not supplied when the  
condition of the atmosphere of said NOx occluding and  
5 reducing catalyst is one for promoting the SOx occluded  
by the NOx occluding and reducing catalyst to be released  
from the NOx occluding and reducing catalyst.

4. A method of purifying exhaust gas of an  
internal combustion engine comprising steps of:

10 disposing a NOx occluding and reducing  
catalyst in an exhaust gas passage of the internal  
combustion engine to selectively occlude and hold NOx in  
the exhaust gas by adsorption, by absorption or by both  
of them when the air-fuel ratio of the exhaust gas  
15 flowing in is lean, and to reduce the occluded NOx with  
reducing components in the exhaust gas when the air-fuel  
ratio of the exhaust gas flowing in becomes the  
stoichiometric air-fuel ratio or a rich air-fuel ratio;  
and

20 causing said catalyst to occlude the NOx  
in the exhaust gas from the engine when the engine is  
operated at a lean air-fuel ratio, and purifying the NOx  
occluded by said catalyst by reduction with reducing  
components in the exhaust gas from said engine when the  
25 engine is operated at the stoichiometric air-fuel ratio  
or at the rich air-fuel ratio;

wherein a sulfur-solidifying agent that  
forms a solid sulfate upon the reaction with SOx at the  
time of combustion is supplied to the engine to solidify  
30 the SOx in the exhaust gas thereby to prevent the SOx in  
the exhaust gas from being occluded by the NOx occluding  
and reducing catalyst, and the amount of supplying said  
sulfur-solidifying agent to the engine is controlled  
depending upon the operating condition of the engine.

35 5. A method of purifying exhaust gas of an  
internal combustion engine as set forth in claim 4,  
wherein said sulfur-solidifying agent is supplied to the

engine in a decreased amount or is not supplied when said internal combustion engine is operated under a condition of suppressing the occlusion of SOx by the NOx occluding and reducing catalyst.

5           6. A method of purifying exhaust gas of an internal combustion engine as set forth in claim 4, wherein said sulfur-solidifying agent is supplied to the engine in a decreased amount or is not supplied when said internal combustion engine is operated under a condition  
10 of promoting the SOx occluded by the NOx occluding and reducing catalyst to be released from the NOx occluding and reducing catalyst.

          7. A method of purifying exhaust gas of an internal combustion engine as set forth in claim 4,  
15 wherein said sulfur-solidifying agent is supplied to the engine in a decreased amount or is not supplied when said internal combustion engine is operated under a condition of promoting the formation of deposit in the engine due to said sulfur-solidifying agent.

20           8. A method of purifying exhaust gas of an internal combustion engine as set forth in claim 4, wherein said sulfur-solidifying agent is supplied to the engine in a decreased amount or is not supplied when said internal combustion engine is operated under a condition  
25 of promoting the occurrence of knocking due to the addition of said sulfur-solidifying agent.

          9. A method of purifying exhaust gas of an internal combustion engine as set forth in claim 4,  
30 wherein said sulfur-solidifying agent is supplied to the engine in a decreased amount or is not supplied when the knocking has occurred in said internal combustion engine.

          10. A method of purifying exhaust gas of an internal combustion engine comprising steps of:  
35               disposing a NOx occluding and reducing catalyst in an exhaust gas passage of the internal combustion engine to selectively occlude and hold NOx in the exhaust gas by adsorption, by absorption or by both

of them when the air-fuel ratio of the exhaust gas  
flowing in is lean, and to reduce the occluded NOx with  
reducing components in the exhaust gas when the air-fuel  
ratio of the exhaust gas flowing in becomes the  
5 stoichiometric air-fuel ratio or a rich air-fuel ratio;  
and

causing said catalyst to occlude the NOx  
in the exhaust gas from the engine when the engine is  
operated at a lean air-fuel ratio, and purifying the NOx  
10 occluded by said catalyst by reduction with reducing  
components in the exhaust gas from said engine when the  
engine is operated at the stoichiometric air-fuel ratio  
or at the rich air-fuel ratio;

wherein a sulfur-solidifying agent that  
15 forms a solid sulfate upon the reaction with SOx at the  
time of combustion is supplied to the engine to solidify  
the SOx in the exhaust gas thereby to prevent the SOx in  
the exhaust gas from being occluded by the NOx occluding  
and reducing catalyst, and the amount of supplying said  
20 sulfur-solidifying agent to the engine is controlled  
depending upon the NOx occluding capability of said NOx  
occluding and reducing catalyst.

11. A method of purifying exhaust gas of an  
internal combustion engine as set forth in claim 10,  
25 wherein when the NOx occluding capability of said NOx  
occluding and reducing catalyst becomes lower than a  
predetermined value, said sulfur-solidifying agent is  
supplied to the engine in an increased amount or the  
supply thereof is started.